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ABSTRACT

Research has documented that vocational education and training (VET) is critical to Malaysia's industrial development. Rapid technological changes and increased global competition have exacerbated the challenges associated with delivery of quality VET in Malaysia. The barriers to improving VET in Malaysia and ways of overcoming those barriers, improving Malaysia's VET system, and furthering the professional development of VET educators were therefore explored. Best practices in school-to-work, college preparation, VET, and lifelong learning were reviewed. The following were among the 13 recommendations presented: (1) the government and private sector should maintain and expand VET in Malaysia; (2) the government should seek input from numerous stakeholders, including educators, business/industry, parents, students, and academicians, before formulating major policy decisions regarding VET; (3) the school curriculum should emphasize a balanced approach through integration of technical, employability, and generalizable skills in VET programs; (4) establishment and maintenance of quality standards for VET programs should be emphasized; (5) VET educators must receive additional professional development opportunities; (6) issues of dissatisfaction among VET educators must be addressed at all levels of government; (7) VET programs should incorporate entrepreneurship and business training; and (8) public and private sector leaders must acknowledge the importance of R&D. (Contains 27 references.) (MN)

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The Best Practices for Professional Development of Vocational Educators in Teaching Competencies among APEC Economies: A Case Study of Malaysia

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Abstract

The future of Malaysia's competitiveness depends on the skills of its workforce. Research has shown that vocational and technical education has assumed a significant role in the industrial development of Malaysia in terms of supplying necessary skilled workers and professionals. However, rapid technological changes and increased global competition have exacerbated the challenges associated with the delivery and quality of vocational and technical education in Malaysia. Employers lamented that graduates of vocational and technical institutions lacked of employability and critical skills. With the increasing demand for knowledge workers with high-order thinking skills, the education system should react proactively. This paper will review pertinent events and trends in Malaysia reform initiatives in vocational and technical education. The paper will also discuss government policies and initiatives in preparing for k-economy and globalization; partnership between public and private sectors; teacher training; infrastructure; and quality assurance. Recommendations for policy and practice will be offered.

Introduction

With the vision of becoming an industrialized nation by 2020, Malaysia must be prepared to provide well-educated, skilled and competitive workforce. The need to transform Malaysia into a knowledge-based economy (K-Economy) is becoming more urgent given the challenges that are coming from the era of globalization. With the move towards K-Economy, the country can achieve sustainable GDP growth rates in the long run with knowledge playing a predominant role in driving productivity and sustaining economic growth. It is projected that through an information and knowledge based economy, the level of the country's GDP can increase by four folds within 20 to 25 years (Bumiputra-Commerce Bank, 2000). Malaysia has achieved one of the fastest rates of economic development of any developing country in the world (Govindan, 2000). Between 1970 and 1999, the economy grew at an average of 7% per annum, bringing along major economic and social transformation. However, with the recent regional financial crisis, the economy suffered a major recession in 1998 with real GDP contracting by 7.4%. The economy has, however, rebounded quickly to reverse the slide to record a 5.8% growth in output in 1999 (Table 1). GDP expanded by 10.3% in the first half of 2000 and expectations are that GDP growth for the year as a whole will be 7-8%. Growth prospects for the years ahead are bright and

will be sustained by continued rise in the global demand for electronics as well as growth in domestic demand, in particular consumer spending (Govindan, 2000).

Table 1. GDP Growth in East Asia, 1996-1999

	1996	1997	1998	1999
Thailand	5.5	-1.8	-10.4	4.0
Indonesia	8.0	4.5	-14.2	0.2
Malaysia	8.6	7.5	-7.5	5.8
South Korea	7.1	5.0	-5.8	9.0
Singapore	6.9	9.0	0.3	5.5

Note. Data source: National Economic Action Council, 2000.

However, Malaysia currently lacks some of the critical elements to support the K-Economy. Among them are the lack of adequate knowledge and skilled human resources, inadequacy of a K-Economy supportive education and training infrastructure, lack of R&D capability, relatively weak science and technology base, deficiency in institutional support and infostructure, a slowly evolving financing system, and a lack of technopreneurs.

Vocational and Technical Education and Training

Malaysia is a multiracial country with a population of 23 million. Constitutionally, education in Malaysia is the prerogative of the federal government. Historically, formal vocational education in Malaysia was introduced by the British in 1897 to train Malay youths as mechanics or fitters to manage the railway lines (Federation of Malaya, 1956; Zakaria, 1988). However, it was not until 1906 when the first public technical school was opened to train technicians to work in various government departments that vocational training began to have an impact (Lourdesamy, 1972). In 1926, the first trade school was opened in Kuala Lumpur, thus marked the beginning of public vocational education in Malaysia (Ministry of Education, 1967). The trade schools offered courses for fitters, electricians, carpenters, brick layers, and tailors.

The period 1961-1965 was a transitory period, where a number of changes being introduced to adapt the education system to meet the needs of a rapidly developing nation. Following the recommendation of the Education Review Committee in 1960, the trade schools, which provided two-year courses, were converted into Rural Trade School offering apprenticeship programs for rural Malay youths who had completed six years of elementary education (Ministry of Education, 1967).

A major change in the vocational educational program occurred in 1965 when the comprehensive education system was introduced. The new system, which raised the school-leaving age to 15, was designed to change the form and content of secondary-level education by expanding and diversifying the range of courses offered. Students received general education with a vocational or technical emphasis in industrial arts (woodwork, metalwork, electricity, and power mechanics),

agriculture science, commercial studies, and home science (Kee, 1973; Lourdesamy, 1972; Ministry of Education, 1967; Zakaria, 1988).

In 1987, a new vocational education system was introduced. Under this system, vocational students are given a choice; either to enroll in vocational program, which at the end of the two-year duration the students will take the Malaysian Certificate of Vocational Education (SPMV) examination, or to enroll in the skills training program at the end of 2-year training period, the students will take the National Industrial Training and Trade Certification Board (NITTCB) examination. The NITTCB was set up by the National Advisory Council of Industrial Training to provide common trade standards and to improve the training institutions throughout the country (Ministry of Education, 1989).

In the vocational track, students are given emphasis on academic subjects with the purpose of providing them a better foundation should they decide to continue their higher education in technical colleges or polytechnics, without affecting vocational skills development at the lower level. In the skills training track, students are given more time and emphasis on skills training and development as required by industry. At the end of the course, the skills track students will take the NITTCB examination. Opportunities are given to students in this track to have advanced and specialized training after completing the two-year basic skills training program. Completers of the skills training program are most likely to enter job-market immediately after graduation. Table 2 shows the enrollment in the public technical-vocational and skills training programs.

Table 2. The Enrollment in Public Technical-Vocational and Skills Training Programs in 1999

Program	Male	Female	Total
Technical and vocational	31,026	14,189	45,215 (92.1%)
Skills training	3,699	206	3,905 (7.9%)
Total	34,725	14,395	49,120

Note. From Malaysian Educational Statistics, 1999.

Continued efforts have been made to expand the supply of skilled and semi-skilled human resource through increased enrollment in the public secondary technical and vocational schools. In 1995, there were 9 technical and 69 vocational schools as compared to 58 vocational and 9 technical schools in 1990. The enrollment in these schools increased from 30,940 in 1990 to 48,800 in 1995, while the output was 13,500 for secondary technical schools and 82,700 for secondary vocational schools for the 1990-1995 period (Economic Planning Unit, 1996). The majority of the graduates from secondary technical schools continued their studies in

various post-secondary institutions, while the graduates from vocational and skill programs were mainly absorbed into the workforce.

Technical Schools

Recently, the Ministry of Education has made a dramatic shift to upgrade technical education, not only because of the requirements of the economy but also to increase more science and technical human resource (Economic Planning Unit, 1996). In this regard, 22 secondary vocational schools were converted into secondary technical schools for the 1996 school session. In 2000, the conversion increases technical schools to 77 and reduces vocational schools to 4 (Malaysian Educational Statistics, 2000). At the same time, engineering technology and technical drawing subjects were also introduced in selected academic secondary schools. The move was to open up opportunities for academic students who inclined to be in technical areas as well as to prepare them to continue their studies in various science and technical-related disciplines at the post-secondary level (Economic Planning Unit, 1996). However, this conversion was criticized by vocational educators who perceive that the shift will severely restrict the future supply of blue-collar skilled workers that are already in severe shortage (Abdul Raof, 1996).

Polytechnics

Since 1969, the Ministry of Education has established 12 public polytechnics as post-secondary learning institutions for technical and commercial training. The main objective is to train secondary school leavers to become qualified technical assistants, technicians, technologists, paraprofessionals, and business personnel. Polytechnics are internally accredited by the Ministry of Education and many have received external ISO 9002 certification.

Presently, all courses offered by the polytechnics are full-time courses and are categorized as either Certificate or Diploma programs. All certificate programs are of two-year duration, while most diploma programs are of three-year duration; with the exception of Diploma in Marine Engineering (4 years) and Diploma in Secretarial Science (2 years). Industrial training where students work in an industry setting for a period of one semester, is a requirement for all programs. The industrial training allows students to experience working conditions and to expose them to the realities and demands of the industrial and commercial sectors (Ministry of Education, 1994).

Post-secondary Advanced Skills Training Programs

Advanced public and private skills training institutions have been established to supply adequate skilled workers to meet the expanding industrial sector. Various measures were taken to increase training capacity through the expansion of existing facilities and the establishment of new institutions. The intake of trainees was also increased through the introduction of double-shift training sessions and the implementation of weekend classes. These measures may result in an increase in the output of trainees from 21,169 in 1990 to 51,983 in 2000 as shown in Table 3. In general, public training institutions show an increase in the output in 2000 especially in printing trades and skill upgrading programs. Private training institutions,

however, show an increase in the output in electrical engineering programs and printing trades.

Table 3. Output of Skilled and Semi-Skilled Graduates from Public and Private Training Institutions

Program	1990 Public	1990 Private	1990 Total	2000 Public	2000 Private	2000 Total
Engineering:	15,076	2,715	17,791	22,994	15,078	38,072
Mechanical	9,661	709	10,370	11,862	3,378	15,240
Electrical	5,230	1,936	7,166	10,896	11,551	22,447
Civil	185	70	255	236	149	385
Building Trades	2,686	110	2,796	3,954	412	4,366
Printing Trades	29	9	38	2,392	51	2,443
Others	18	429	447	4,984	1,158	6,142
Skill-Upgrading	97	n.a.	97	960	n.a.	960
Total	17,906	3,263	21,169	35,284	16,699	51,983

Note. From Economic Planning Unit, 1996.

To meet the needs for higher skilled workers especially in the new technology clusters and to take advantage of advanced technology in developed countries, advanced skilled training institutes were established with the cooperation of the Federal Republic of Germany, France, and Japan. The German-Malaysian Institute (GMI), established in 1992, offered advanced skill training, particularly in production technology and industrial electronics. The institute, with a maximum enrollment capacity of 450 trainees, produced its first batch of 57 graduates in 1995. The Malaysian-France Institute (MFI), began operation in October 1995, had a capacity of 600 trainees and offered courses at advanced level in areas such as maintenance of automated mechanical systems, electrical equipment installation and welding technology. In addition, the establishment of the Japan-Malaysia Technical Institute (JMTI) is at the planning stage.

The Employment

Based on GDP growth of 7 percent per annum, the demand for labor will increase by 3.1 percent annually during 1990-2000 period (Economic Planning Unit, 1996). Total employment is projected to increase from about 6.7 million in 1990 to about 9 million in the year 2000 as shown in Table 4. Employment is expected to increase in manufacturing, construction, and services sector of the economy. However, employment in traditional sector such as agriculture, mining, and the government is expected to decrease. With labor supply growing at 2.9 percent annually, the unemployment rate is expected to decrease from 5.1 percent in 1990 to about 2.8 percent by the end of the decade. Table 4 shows figures of employment in different sectors.

Table 4. Numbers of Employment in Different Sectors, 1990-2000

Sector	1999 ('000)	(%)	2000 ('000)	(%)
Agriculture, Forestry Livestock & Fishing	1,738	26	1,187.7	13.1
Mining & Quarrying	37	0.6	44.5	0.5
Manufacturing	1,333	19.9	2,616.3	28.9
Construction	424	6.3	845.4	9.3
Services	1,825	27.3	2,539.5	27.9
Government	850	12.7	894.2	9.9
Other Services	479	7.2	938.6	10.4
Total	6,686	100	9,066.2	100
Labor Force:	7,042		9,327.1	
Local	6,752		8,546.1	
Foreign	290		781	
Unemployment	356	5.1	260.9	2.8

Note: From Economic Planning Unit, 1996.

Because of high growth of the working-age population, an increase in the labor force participation rate from 66 percent in 1990 to 66.9 percent in 1995, and large inflows of foreign labor, the labor force increased at an average annual rate of 2.9 percent

during 1990-1995 (Economic Planning Unit, 1996). The labor force participation is expected to reach 68 percent in the year 2000. The male labor force participation rate increased from 86.3 percent in 1990 to 86.8 percent in 1995, while the rate of females increased from 45.8 percent to 47.1 percent during the same period (Economic Planning Unit, 1996). The educational profile of the labor force shows a progressively more educated workforce. About 55 percent of the labor force had secondary education in 1995 as compared to 52 percent in 1990. In addition, while 5.3 percent of the labor force had college or university qualification in 1990, the proportion was 6.3 in 1995. Despite this increase, the proportion was still relatively low compared to developed nations. Therefore, systematic plan should be made to increase the supply of highly educated human resource (Economic Planning Unit, 1996).

Professional Development of Vocational Educators in Malaysia

A recent empirical research regarding professional development of vocational educators in Malaysia was conducted by Ramlee Mustapha (1999). The sample consisted of 300 randomly selected vocational educators in Malaysia. This survey asked the respondents to list the three most important factors that should be considered when planning the improvement of vocational and technical education and training. The responses were categorized, frequency-counted, and ranked-ordered. The highest frequency category was ranked first, followed by the second-highest, and the third-highest. Table 5 presents the ranking of the most important factors in planning the improvement of vocational and technical education and training systems as perceived by educators. The educators ranked professional development and in-service training for vocational and technical teachers as the most important factor. Lack of in-service training and professional development is evident in this study. In fact, 16.2 percent of educators reported that they have never attended any in-service training during the past 5 years. Professional development included professional networking, industrial attachment, knowledge and skills upgrading, and further education. The provision of adequate facilities and current equipment was ranked second and the allocation of adequate funding was ranked third.

Table 5. Critical factors in planning the improvement of vocational and technical education

	Educators (n=276)	
Rank	Factor	Frequency
1	Professional development and in-service training for vocational and technical educators	146
2	Adequate facilities and equipment	106
3	Adequate funding	66

The second item asked respondents to identify the three most important barriers that they believe impeded efforts to initiate the improvement of vocational and technical education and training systems. As illustrated in Table 6, educators cited inadequate funding as the most important barrier, followed by lack of industrial experience among vocational educators and inadequate facilities.

Table 6. Barriers to the improvement of vocational and technical education

	Educators (n=276)	
Rank	Factor	Frequency
1	Inadequate funding	100
2	Teaching staff lack of industrial experience	99
3	Inadequate facilities	75

The third item asked the respondents to list the three most important skills and knowledge areas that vocational and technical graduates should possess. Table 7 illustrates the rank-order as perceived by educators. Educators ranked technical skills as most important. Communication skills were perceived by educators as the second most important skills and knowledge areas that graduates should possess. Educators ranked critical thinking and problem-solving as the third most important skills.

Table 7. Important skills and knowledge that vocational and technical graduates should possess

	Educators (n=276)	
Rank	Factor	Frequency
1	Technical skills	134
2	Communication skills	106
3	Critical thinking and problem-solving skills	46

The fourth item asked respondents to identify any additional problems or issues related to vocational and technical education in Malaysia. As presented in Table 8, educators viewed the lack of incentives as the most important issue. Low salaries, few opportunities for promotion, and lack of recognition were identified as problematic. Educators cited the vague policy regarding the status of vocational schools as their second major concern. This included the new policy of the Ministry of Education to reduce the number of vocational schools in favor of more "academically-oriented" technical schools. In addition, educators viewed inadequate affective skills of vocational and technical students as their third concern.

Table 8. Additional problems and issues related to vocational and technical education in Malaysia

	Educators (n=276)	
Rank	Factor	Frequency
1	Lack of promotion and incentives for vocational educators	18
2	Vague policy regarding the status of vocational schools	6
3	Lack of emphasis on personal development of vocational students	5

Best Practices and Reform Initiatives

School-toWork

Even though, no formalized School-to-Work systems have been established in Malaysia, the high-level leadership in the educational domain is considering a plan for the development of comprehensive lifelong education that is connected to the world of work. This is evident by the statement from Hussein Ahmad, former Director of Technical and Vocational Education (TAVED), Ministry of Education. He asserts:

> In line with the concept of lifelong education, Malaysia has, besides providing the students with skills for immediate gainful employment, also included academic subjects in all technical and vocational education programmes. The system has an open and flexible structure which takes into account the individual's educational needs and the requirements of occupations and jobs (Ahmad, 1994, p.58).

College-Preparation and Technical-Preparation in Malaysia

The major factor that could seriously inhibit Malaysia's plan to industrialize is the inability of the school system to graduate enough students with technical competencies to enter the future high-tech labor market (Abdullah, 1996). Malaysia is facing a serious shortage of professionals and skilled workforce as shown in Table 9.

Table 9. Capacity of Local Institution to Meet the Demand for Selected Professional and Technical Occupations, 1991-2000

Occupation	Stock 1990	Employment 1991-2000	Local supply	Gap 1991-2000
Engineers	26,500	36,100	18,900	17,200
Civil	11,100	10,100	3,330	6,770
Electrical	6,200	10,100	3,780	6,320
Mechanical	5,200	6,700	3,600	3,100
Chemical	800	1,400	810	590
Others	3,200	7,800	7,380	420

Technicians	72,400	147,500	94,473	53,027
Civil	27,100	37,700	18,900	18,800
Electrical	32,300	52,300	27,000	25,300
Mechanical	6,400	31,200	19,080	12,120
Chemical	600	6,500	513	5,987
Others	6,000	19,800	28,980	9,180

Note. From Economic Planning Unit, 1996.

To deal with the shortage of skilled and semi-skilled workers in the engineering and technical areas, education and training at the secondary and post-secondary levels must be restructured and expanded, particularly, in vocational and technical areas. Although the government has targeted the 60:40 ratio for students' enrollment in science versus arts, respectively, the pattern of school enrollment during the past 15 years has shown a reverse trend (Abdullah, 1996). The enrollment of students in science in public high school has decreased from 30.37 percent in 1981 to 18.61 percent in 1995. In absolute number, the enrollment rate in science decreased from 99,843 in 1986 to 87,378 in 1995 (Abdullah, 1996). However, there is a four-fold increase of enrollment in vocational education from 13,287 in 1981 to 61,182 in 1995. The increased participation rate in the vocational education is due to the aggressive policy actions and facility expansions during that period which reflect a growing interest among the government and the community at large to find an alternative education option besides the traditional academic college-prep track.

At present, five educational "tracks" are being enforced in public secondary schools in Malaysia. The tracks and their 1995 enrollment percentage (in bracket) are as follows: Arts (64.5%), Science (19%), Technical (1.2%), Vocational (13%), and Skills Training (2.3%). In terms of international comparison, enrollment in vocational and technical education in Malaysia is still low as compared to other countries such as Taiwan (67.2 %), France (22.2 %), and Korea (18.1%) (Wu, 1996). If the Arts and Science tracks were to be combined to constitute Academic or "College-Preparation" track, and Technical-Vocational-Skills Training is clustered as "Technical-Preparation" track, then the ratio of College-Prep to Tech-Prep become 84:16. This clearly indicates a serious imbalance of future workforce. With less than 10% of total high school graduates are admitted to colleges and universities each year, many young high school graduates with general education but without specific marketable skills are becoming either unemployed or underemployed with minimal wage. Nevertheless, the current unemployment rate is still relatively low at 2.8 percent because of the abundant of labor-intensive jobs, particularly in manufacturing, construction, and service industries that absorb these unskilled workers. However, the future shifts toward capital-intensive, high-tech industries may reduce the intake of unskilled workers. Therefore, the authors recommend to the Ministry of Education to increase the students' enrollment in Tech-Prep track from 16

percent to 35 percent in order to adequately supply the high-tech and skilled workforce.

Currently, there is no specific legislation that provides clear guidelines for Tech-Prep or School-to-Work Transition. However, the country's national policy for vocational and technical education is outlined in the Cabinet Committee Report on Training (1991), Vision 2020 (1991), the 1995 New Education Act, the 1995 Amendment to the University and College Act of 1975, and the Seventh Malaysia Plan (1996-2000). These reports and legislation have been instrumental in reforming the present education system. More work-based components are being incorporated into the mainstream school-based education. For example, new initiatives such as "Tech-prep," integration of academic and vocational education and partnership with business and industry are leading the reform agenda.

Partnership

Recently, a number of medium and large companies in Malaysia have participated in partnership with a number of public vocational and technical schools and institutions and skills centers to help to train students (Ahmad, 1994). The companies provide the equipment and supply the high-level technical instructors, who work together with the center instructors. The synergistic relationship has been beneficial to both parties. Below are some of the examples:

1. PROTON (National Car Manufacturer) and EON (National Car Distributor) have donated since 1993, PROTON cars and automobile engines to various public vocational and technical schools under the supervision of the Ministry of Education.
2. Toyota has sponsored a Toyota Lab at the Institut Kemahiran MARA (MARA Skills Institute).
3. PETRONAS (National Oil Company of Malaysia) has adopted a wing of the Ministry of Education's Polytechnic at Kuching, Sarawak to help produce skilled workers required for the specific needs of the companies.
4. Esso Malaysia Inc. has provided equipment to a number of MARA Skills Institutes to upgrade the skills of technicians.
5. Shell Malaysia Inc. involved in *Project LINK* with a secondary vocational school in Miri, Sarawak to train students in advanced welding program. The course syllabus was designed jointly by the Technical and Vocational Division (TAVED), Ministry of Education and Shell Company to suit the specialized welding requirements of the petroleum industry. Specialized industrial training was also conducted by the Shell instructors for the Miri vocational school staff who are now handling the major part of the welding program.
6. A joint training program between a polytechnic (POLIMAS) and Matsushita Electric Motor (MAEM) has been established to upgrade the technical workers from MAEM using the POLIMAS facilities and expertise.

Time Sector Privatization

It is well-known fact that vocational education and training involves a high cost. To offset the high cost, polytechnics have introduced a program called Time Sector Privatization. It is a cost recovery program that permits the private and the public sector to make use of the facilities. The private sector is welcome to utilize these facilities through time sector privatization. Under this program, fee is charged to the interested party that agrees to use the facilities for training purposes (Ahmad, 1994; Fok, 1994).

Establishment of Advisory Council

To further develop a closer relationship with private industrial sector and to strengthen school-business ties, Technical and Vocational Department, Ministry of Education (TAVED) is establishing the National Advisory Council for Technical and Vocational Education. One the objectives of this national advisory council is to review the selection of courses and programs, including the curriculum of the vocational and technical schools and polytechnics.

It will also be entrusted with the task to help identify the latest skills cluster needed by business and industry. At least half of the members of the council will be from business and industry. At the institutional level, efforts are being been made to establish Management Advisory Committees for all polytechnics and vocational schools. Where necessary, program advisory committee can also be set up (Ahmad, 1994).

The Use of Expertise from Industrial Sector

The Ministry of Education, through TAVED, has initiated a move to bring high-tech instructors and master craftsmen from the Industrial sector to become "adjunct instructors" at polytechnics and vocational and technical schools. The industrial sector has a pool of technical personnel with advanced skills. Recognizing that those talents can contribute toward improving vocational and technical education and skills training program, TAVED intends to utilize this expertise and expose the students to the people directly involved in the trade industry on "day in - day out" basis. These experienced workers are in a better position to teach vocational and technical students not only the technical content but also the attitude and work ethics required by the industrial employers. Research has shown that employers cited positive attitude toward work, social and affective skills as among top qualities that they are looking for in prospective employees (Baxter & Young, 1980; Carnevale et al., 1990; Greenan, Wu, Mustapha, & Ncube, 1998; Junge et al., 1984; Lee, 1986).

Staff Recruitment and Development

There will be a more open and flexible system in staff recruitment, in-service, and professional development for vocational and technical educators. Academic qualification will no longer be a sole criterion for the recruitment of academic staff. Industrial experience and technical competency will be main factors for consideration. There will also be staff exchange between vocational and technical institutions and industries. Staff development and skills upgrading will be a major priority in vocational and technical education and training. The government realizes that without quality educators, vocational and technical education will fail to produce quality workers (Abdullah, 1996).

Since there are scores of public skills centers, technical institutes, polytechnics, and vocational schools all over the country, it is convenient for private companies and firms to use these public education and training institutions to train, retrain, or enhance the skills of various apprentices and other skilled personnel that the labor market wants.

Part-time Courses

In addition, part-time courses are offered to the public. The opening of the secondary vocational and technical schools and the polytechnics for part-time courses was recently announced by the Ministry of Education (Ahmad, 1994; Fok, 1994). The courses will be opened to the public after school hours as well as during semester break to give more opportunity to non-traditional students and working people to upgrade their skills and knowledge. Both school-community and school-business collaborations and partnerships are given high priority on the vocational education reform agenda.

Life-long Learning

With knowledge replacing physical and natural resources as the key ingredient in economic development, the education system and human resource development policies must be given due priority. The approach to human resource development (HRD) must be balance and holistic. There must be genuine smart partnership between government ministries, especially the Human Resource and Education Ministries, and between the private and public sectors to strategize and implement a human resource policy that is directed towards fulfilling the objectives of a K-Economy (Badawi, 2000). As the economic development is now more dynamic than ever due to rapid technological improvements and global competition, the skills needed to succeed in this new economy will be different. Few will be able to equip themselves with lifetime working skills just from their years of formal education.

Life-long learning conducted through non-formal channels such as virtual universities and distance learning, with skill acquisition at all age levels, must be promoted if the human resource is to constantly stay abreast of new and rapid developments in the K-Economy. In the context of human resource development, Malaysia needs to adopt a two-pronged strategy (Badawi, 2000). One is to ensure that those who are currently unskilled or low-skilled are given the opportunity to learn and train so that they can have a productive role in the K-Economy. And secondly, incentives and opportunities must be given to those with potential to keep on acquiring knowledge and skills. Human resource development must move every Malaysian up the skill ladder, and at the same time reward excellence by allowing every one to fulfill their potential. If the school and training systems fail to train and retrain the traditional workers, their existing skills may become obsolete in the new economic environments. If those with minimal education, knowledge or skills were not given the opportunity to continue their education, they would lag behind and would be less likely to participate in K-Economy. Indirectly, the government would lose precious human capital that could have been harnessed effectively into a new economic paradigm.

Therefore, human resource development must be viewed not only from the perspective of social justice where every Malaysian is given the opportunity to succeed, but also from the point of view that in a K-Economy where every individual is given the chance to contribute at his or her optimum level.

It is evident that the Malaysian government is committed to building a critical mass of knowledge workers. Already under consideration are plans to build more advanced technical-industrial training institutes and community colleges. In addition, the establishment of more 'second route' programs aimed at giving school leavers the opportunity to re-sit examinations or guiding them towards technical and vocational training. There is also a need for greater alliances between universities and the private sector to encourage industrial placements, internships and targeted human resource development. Greater attention must also be given to training workers in the small and medium industries (SMI). Most large firms can afford to invest in training, retraining and R&D.

Therefore, public sector HRD initiatives must prioritize SMI workers who are not given opportunities to enhance their skills by their employers. At the same time ICT training must be promoted, especially among working adults, to increase IT literacy among the workforce. School teachers should be given incentives to continue to upgrade their ICT skills in light of the primacy of these tools in the K-Economy. Civil servants and servicemen should also be given this training so that they are able to be absorbed into the technology intensive private sector upon the completion of their service. ICT training should also be extended to non-working adults such as the disabled, older folks and housewives so that they can contribute to the K-Economy as virtual home-based workers, offering services through virtual interfaces such as the internet.

In recognizing that human resource development is a critical factor in a K-Economy, more genuine smart partnerships between the public and private sector should be established. In particular, the private sector must play a greater role in technical and vocational training in order to complement the effort that has been put in by the government at the moment. The government should continue to assist the private sector in training and retraining workers, but there must be a continued commitment from the private sector to encourage and provide incentives for their workers to acquire more skills.

Recommendations

Some of the recommendations include:

- The government and private sector should maintain and expand vocational and technical education and training in Malaysia. In particular, the government should utilize the large potential of employers and private sector involvement in the investment of vocational and technical education and training.

- Federal, state, and local agencies should provide a clear vision and mission for vocational and technical education and training. In addition, the government should provide effective leadership and incentives to the private sector by assisting to create partnerships and collaboration with vocational and technical institutions.

- The government, especially the Ministry of Education, should seek input from numerous stakeholders, such as, educators, business/industry personnel, parents, students, academicians, and other professionals before formulating major policy decisions regarding vocational and technical education and training.

- A balanced approach should be emphasized in school curriculum through the integration of technical, employability, and generalizable skills curriculum in vocational and technical programs. In addition, vocational and technical curriculum should be flexible and responsive to the present and future needs of the nation.

- The government should reduce bureaucracy and increase the efficiency and effectiveness of vocational and technical education. Further, the Ministry of Education should consider decentralizing the management of public vocational and technical institutions and encourage the expansion of private and community-supported vocational and technical schools and training.

- The government and its agencies should be more proactive rather than reactive in responding to and managing human resource needs. This can be accomplished by eliciting input from business and industry and creating meaningful partnerships with the private sector.

- Increased emphasis should be on establishing and maintaining quality standards for vocational and technical programs.

- Create an information society for all, where every citizen can play an active role in the K-Economy.

- Vocational and technical educators must have additional professional development opportunities. Professional development may include in-service education, networking, industrial attachment, and knowledge and skills upgrading.

- Federal, state, and local authorities should address the issues of dissatisfaction among vocational and technical educators. Disincentives include, however, are not necessarily limited to low salary, few opportunities for promotion, and lack of recognition.

- Vocational and technical programs should incorporate entrepreneurship and business training into its curriculum to nurture potential entrepreneurs.

- Public and private sector leadership should become aware of the importance of research and development to sustain Malaysia's competitive edge. Therefore, collaborative and systematic research and development should be initiated by the public and private universities and research institutions.

- Policy makers should introduce legislation related to new reform initiatives such as school/business partnerships, school-to-work activities, technology preparation, and work force development to sustain and private sector commitment to education, training, and human resource development.

Conclusion

The proposed strategies to reform vocational education and training systems in Malaysia will succeed provided that the government is committed to restructure vocational education and training systems. What is required is more systematic coordination between public vocational and technical education and training and the private sectors. School-to-Work strategies call for a planned and structured work experience that has productive educational value and is carefully coordinated with the learning taking place in the classroom. Further, what is required is better rapport between the vocational education systems and the employers. More receptive and proactive attitudes among employers and educators must take place with respect to skills and vocational training. To compete and survive in the era of K-Economy and globalization, Malaysia needs to find a new niche as it can no longer rely on being a low cost producer or the center for cheap labor. It is important for the country to embrace knowledge in all factors of production in order to create value added products as well as services. K-Economy has required knowlegable, skilled, dynamic, creative and innovative human resources. Thus, the education, training, and employment policies have to change. Employers need to recruit "knowledge" workers for higher skills jobs. This requires our education system to produce graduates with relevant knowledge, critical skills, and proper attitudes. Teacher training program must also undergo substantial transformation especially in technical and vocational education. The current technical education and training systems in Malaysia need to be improved to ensure that skilled and knowledge workers' shortages will not pose a serious bottleneck to future industrialization.

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